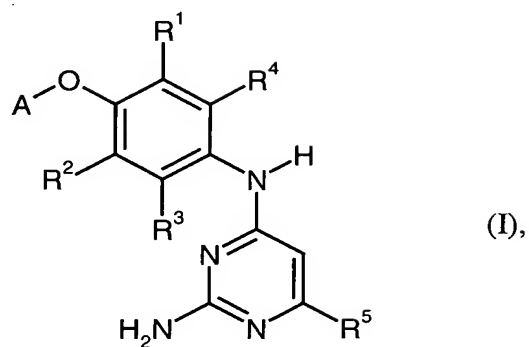


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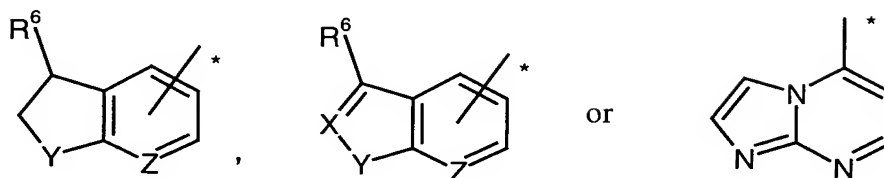
**Claims**

1. A compound of the formula



in which

A represents a radical



in which

X represents N or C-H,

Y represents N-R<sup>7</sup>, O or S

in which

R<sup>7</sup> represents hydrogen, benzyl, phenyl, (C<sub>1</sub>-C<sub>6</sub>)-alkyl or (C<sub>3</sub>-C<sub>8</sub>)-cycloalkyl,

- 179 -

where alkyl and cycloalkyl for their part may be substituted by fluorine, hydroxyl, amino, carboxyl, (C<sub>1</sub>-C<sub>6</sub>)-alkoxy, (C<sub>1</sub>-C<sub>6</sub>)-alkylamino or morpholinyl,

5

Z represents N or C-H,

R<sup>6</sup> represents hydrogen, halogen, trifluoromethyl, (C<sub>1</sub>-C<sub>6</sub>)-alkylamino or W-R<sup>7</sup>,

10

in which

W represents NH, O or a bond,

15

R<sup>7</sup> is as defined above

and

\* denotes the point of attachment to the phenolic oxygen,

20

R<sup>1</sup> and R<sup>2</sup> independently of one another represent hydrogen, halogen or cyano,

R<sup>3</sup> and R<sup>4</sup> independently of one another represent hydrogen, fluorine or chlorine,

25

R<sup>5</sup> represents a radical selected from the group consisting of:

hydrogen, hydroxyl, halogen, trifluoromethyl,

30

(C<sub>3</sub>-C<sub>8</sub>)-cycloalkyl, (C<sub>1</sub>-C<sub>6</sub>)-alkyl, (C<sub>1</sub>-C<sub>6</sub>)-alkoxy,

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where cycloalkyl, alkyl and alkoxy for their part may be substituted by hydroxyl, carboxyl, (C<sub>1</sub>-C<sub>6</sub>)-alkoxy, (C<sub>1</sub>-C<sub>6</sub>)-alkoxycarbonyl, (C<sub>6</sub>-C<sub>10</sub>)-aryl, NR<sup>8</sup>R<sup>9</sup> or C(=O)NR<sup>8</sup>R<sup>9</sup>,

5

in which

R<sup>8</sup> and R<sup>9</sup> independently of one another represent hydrogen, (C<sub>1</sub>-C<sub>8</sub>)-alkyl, optionally (C<sub>1</sub>-C<sub>6</sub>)-alkyl-substituted (C<sub>3</sub>-C<sub>6</sub>)-cycloalkyl, optionally halogen-substituted (C<sub>6</sub>-C<sub>10</sub>)-aryl or 5- to 10-membered heteroaryl

10

or

15

R<sup>8</sup> and R<sup>9</sup> together with the nitrogen atom to which they are attached form a 5- or 6-membered heterocycle which may contain a further heteroatom O or N in the ring and which may be substituted by (C<sub>1</sub>-C<sub>6</sub>)-alkyl, (C<sub>1</sub>-C<sub>6</sub>)-alkanoyl or (C<sub>1</sub>-C<sub>6</sub>)-alkoxycarbonyl,

20

(C<sub>6</sub>-C<sub>10</sub>)-aryl, (C<sub>6</sub>-C<sub>10</sub>)-aryloxy, 5- to 10-membered heteroaryl, 5- to 10-membered heteroaryloxy, 5- to 10-membered heterocyclyl which is attached via a carbon atom,

25

where aryl, aryloxy, heteroaryl, heteroaryloxy and heterocyclyl for their part may be substituted by halogen, cyano, nitro, carboxyl, amino, trifluoromethyl, optionally hydroxyl-substituted (C<sub>1</sub>-C<sub>6</sub>)-alkyl, (C<sub>1</sub>-C<sub>6</sub>)-alkoxy, (C<sub>1</sub>-C<sub>6</sub>)-alkylamino,

30

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(C<sub>1</sub>-C<sub>6</sub>)-alkanoyl, (C<sub>1</sub>-C<sub>6</sub>)-alkoxycarbonyl, (C<sub>1</sub>-C<sub>6</sub>)-  
alkanoylamino, (C<sub>1</sub>-C<sub>6</sub>)-alkoxycarbonylamino or 5- or 6-  
membered heterocyclyl,

5 NR<sup>10</sup>R<sup>11</sup>

in which

10 R<sup>10</sup> and R<sup>11</sup> independently of one another represent hydrogen,  
(C<sub>1</sub>-C<sub>6</sub>)-alkyl, (C<sub>3</sub>-C<sub>8</sub>)-cycloalkyl, (C<sub>6</sub>-C<sub>10</sub>)-aryl or 5- to  
10-membered heteroaryl,

15 where alkyl and cycloalkyl for their part may be  
substituted by hydroxyl, (C<sub>1</sub>-C<sub>6</sub>)-alkoxy, (C<sub>6</sub>-C<sub>10</sub>)-aryl,  
5- to 10-membered heteroaryl or NR<sup>15</sup>R<sup>16</sup>,

in which

20 R<sup>15</sup> and R<sup>16</sup> independently of one another represent  
hydrogen, (C<sub>1</sub>-C<sub>6</sub>)-alkyl, (C<sub>3</sub>-C<sub>6</sub>)-cycloalkyl,  
(C<sub>6</sub>-C<sub>10</sub>)-aryl or 5- or 6-membered heteroaryl

or

25 R<sup>15</sup> and R<sup>16</sup> together with the nitrogen atom to which  
they are attached form a 5- or 6-membered  
heterocycle which may contain a further  
heteroatom O or N in the ring and which may be  
30 substituted by (C<sub>1</sub>-C<sub>6</sub>)-alkyl, (C<sub>1</sub>-C<sub>6</sub>)-alkanoyl or  
(C<sub>1</sub>-C<sub>6</sub>)-alkoxycarbonyl,

- 182 -

and

5 aryl and heteroaryl for their part may be substituted by  
halogen, hydroxyl, amino, cyano, trifluoromethyl, (C<sub>1</sub>-  
C<sub>6</sub>)-alkyl, (C<sub>1</sub>-C<sub>6</sub>)-alkoxy, (C<sub>1</sub>-C<sub>6</sub>)-alkylamino or  
(C<sub>1</sub>-C<sub>6</sub>)-alkanoylamino,

or

10 R<sup>10</sup> and R<sup>11</sup> together with the nitrogen atom to which they are  
attached form a 4- to 6-membered heterocycle which  
may contain a further heteroatom O or N in the ring and  
which may be substituted by fluorine, hydroxyl,  
15 carboxyl, 5- to 7-membered heterocyclyl which may  
contain one or two further heteroatoms N and/or O in  
the ring and which for its part may be substituted by  
(C<sub>1</sub>-C<sub>4</sub>)-alkyl or (C<sub>1</sub>-C<sub>4</sub>)-alkoxycarbonyl, (C<sub>1</sub>-C<sub>4</sub>)-  
alkoxy, optionally hydroxyl-, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy- or  
20 NR<sup>17</sup>R<sup>18</sup>-substituted (C<sub>1</sub>-C<sub>4</sub>)-alkyl, (C<sub>1</sub>-C<sub>4</sub>)-alkanoyl,  
(C<sub>1</sub>-C<sub>4</sub>)-alkoxycarbonyl or NR<sup>12</sup>R<sup>13</sup>,

where

25 R<sup>12</sup> and R<sup>13</sup> independently of one another represent  
hydrogen, (C<sub>1</sub>-C<sub>6</sub>)-alkyl, (C<sub>1</sub>-C<sub>4</sub>)-  
alkoxycarbonyl, (C<sub>3</sub>-C<sub>8</sub>)-cycloalkyl or (C<sub>1</sub>-C<sub>4</sub>)-  
alkanoyl

30 or

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5                   R<sup>12</sup> and R<sup>13</sup> together with the nitrogen atom to which  
                    they are attached form a 5- or 6-membered  
                    heterocycle which may contain a further  
                    heteroatom O or N in the ring and which may be  
                    substituted by (C<sub>1</sub>-C<sub>6</sub>)-alkyl, (C<sub>1</sub>-C<sub>6</sub>)-alkanoyl or  
                    (C<sub>1</sub>-C<sub>6</sub>)-alkoxycarbonyl,

and

10                  R<sup>17</sup> and R<sup>18</sup> independently of one another represent  
                    hydrogen, optionally hydroxyl-substituted (C<sub>1</sub>-  
                    C<sub>6</sub>)-alkyl, (C<sub>3</sub>-C<sub>6</sub>)-cycloalkyl, (C<sub>6</sub>-C<sub>10</sub>)-aryl or 5-  
                    or 6-membered heteroaryl

15                  or

                    R<sup>17</sup> and R<sup>18</sup> together with the nitrogen atom to which  
                    they are attached form a 5- or 6-membered  
                    heterocycle which may contain a further  
20                  heteroatom O or N in the ring and which may be  
                    substituted by (C<sub>1</sub>-C<sub>6</sub>)-alkyl, (C<sub>1</sub>-C<sub>6</sub>)-alkanoyl or  
                    (C<sub>1</sub>-C<sub>6</sub>)-alkoxycarbonyl,

or

25                  R<sup>10</sup> and R<sup>11</sup> together with the nitrogen atom to which they are  
                    attached form a 7- to 12-membered bicyclic or tricyclic  
                    heterocycle which is fused or spirocyclic and which  
                    may have one or two further heteroatoms from the  
30                  group consisting of N and O in the ring and which may

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be substituted by fluorine, (C<sub>1</sub>-C<sub>4</sub>)-alkyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxycarbonyl, (C<sub>1</sub>-C<sub>4</sub>)-alkanoyl or benzyl,

and C(=O)R<sup>14</sup>,

5

in which

10

R<sup>14</sup> represents (C<sub>1</sub>-C<sub>6</sub>)-alkoxy, (C<sub>1</sub>-C<sub>6</sub>)-alkylamino or a 5- to 10-membered mono- or bicyclic heterocycle which is attached via a nitrogen atom, which is fused or spirocyclic and which may have one or two further heteroatoms from the group consisting of N and O in the ring,

15

where alkylamino for its part may be substituted by a 5- or 6-membered heterocycle,

or a salt, a hydrate, a hydrate of a salt or a solvate thereof.

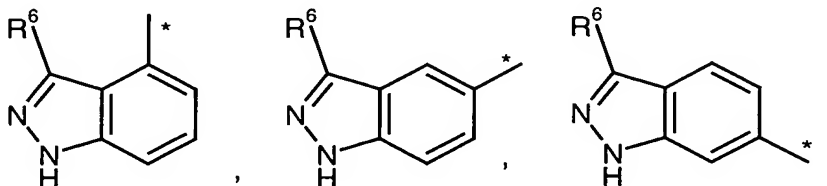
20

2. The compound as claimed in claim 1

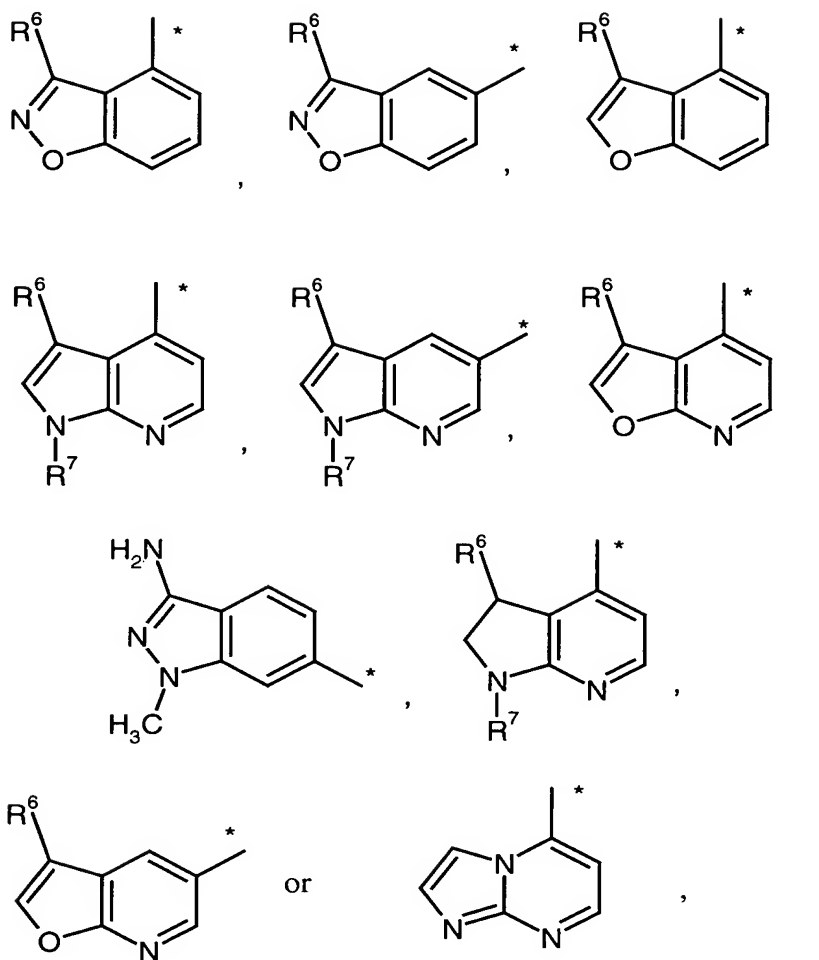
in which

25

A represents a radical



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5

in which

$R^6$  represents hydrogen,  $(C_1-C_4)$ -alkyl or  $NH-R^7$ ,

10

$R^7$  represents hydrogen or  $(C_1-C_4)$ -alkyl

and

$*$  denotes the point of attachment to the phenolic oxygen,

15



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$R^1$  and  $R^2$  independently of one another represent hydrogen, fluorine or chlorine,

$R^3$  and  $R^4$  independently of one another represent hydrogen or fluorine,

5

$R^5$  represents a radical selected from the group consisting of:

hydrogen, chlorine, (C<sub>3</sub>-C<sub>8</sub>)-cycloalkyl, (C<sub>1</sub>-C<sub>6</sub>)-alkyl, (C<sub>1</sub>-C<sub>6</sub>)-alkoxy,

10

where alkyl and alkoxy for their part may be substituted by hydroxyl, carboxyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy, (C<sub>1</sub>-C<sub>4</sub>)-alkoxycarbonyl, NR<sup>8</sup>R<sup>9</sup> or C(=O)NR<sup>8</sup>R<sup>9</sup>,

in which

15

$R^8$  and  $R^9$  independently of one another represent hydrogen, (C<sub>1</sub>-C<sub>8</sub>)-alkyl, optionally (C<sub>1</sub>-C<sub>4</sub>)-alkyl-substituted (C<sub>3</sub>-C<sub>6</sub>)-cycloalkyl, optionally halogen-substituted phenyl or 5- or 6-membered heteroaryl

20

or

$R^8$  and  $R^9$  together with the nitrogen atom to which they are attached form a morpholine, piperazine, piperidine or pyrrolidine ring, where the rings for their part may be substituted by (C<sub>1</sub>-C<sub>4</sub>)-alkyl,

25

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(C<sub>6</sub>-C<sub>10</sub>)-aryl, 5- or 6-membered heteroaryl, 5- or 6-membered heterocyclyl which is attached via a carbon atom,

where aryl, heteroaryl and heterocyclyl for their part may be substituted by halogen, cyano, nitro, carboxyl, amino, trifluoromethyl, optionally hydroxyl-substituted (C<sub>1</sub>-C<sub>4</sub>)-alkyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy, (C<sub>1</sub>-C<sub>4</sub>)-alkylamino, (C<sub>1</sub>-C<sub>4</sub>)-alkanoyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxycarbonyl, (C<sub>1</sub>-C<sub>4</sub>)-alkanoylamino, (C<sub>1</sub>-C<sub>4</sub>)-alkoxycarbonylamino or 6-membered heterocyclyl,

NR<sup>10</sup>R<sup>11</sup>

in which

R<sup>10</sup> and R<sup>11</sup> independently of one another represent hydrogen, (C<sub>1</sub>-C<sub>6</sub>)-alkyl, (C<sub>3</sub>-C<sub>8</sub>)-cycloalkyl, phenyl or 5- or 6-membered heteroaryl,

where alkyl and cycloalkyl for their part may be substituted by hydroxyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy, phenyl, 5- or 6-membered heteroaryl or NR<sup>15</sup>R<sup>16</sup>,

in which

R<sup>15</sup> and R<sup>16</sup> independently of one another represent hydrogen, (C<sub>1</sub>-C<sub>4</sub>)-alkyl, (C<sub>3</sub>-C<sub>6</sub>)-cycloalkyl, phenyl or 5- or 6-membered heteroaryl

or

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R<sup>15</sup> and R<sup>16</sup> together with the nitrogen atom to which they are attached form a morpholine, piperazine, piperidine or pyrrolidine ring, where the rings for their part may be substituted by (C<sub>1</sub>-C<sub>4</sub>)-alkyl,

and

phenyl and heteroaryl for their part may be substituted  
by fluorine, chlorine, hydroxyl, amino, cyano,  
trifluoromethyl, (C<sub>1</sub>-C<sub>4</sub>)-alkyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy, (C<sub>1</sub>-C<sub>4</sub>)-  
alkylamino or (C<sub>1</sub>-C<sub>4</sub>)-alkanoylamino,

or

15 R<sup>10</sup> and R<sup>11</sup> together with the nitrogen atom to which they are  
attached form a 4- to 6-membered heterocycle which  
may contain a further heteroatom O or N in the ring and  
which may be substituted by fluorine, hydroxyl,  
20 carboxyl, 5- to 7-membered heterocyclyl which may  
contain one or two further heteroatoms N and/or O in  
the ring and which for its part may be substituted by  
(C<sub>1</sub>-C<sub>4</sub>)-alkyl or (C<sub>1</sub>-C<sub>4</sub>)-alkoxycarbonyl, (C<sub>1</sub>-C<sub>4</sub>)-  
alkoxy, optionally hydroxyl-, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy- or  
25 NR<sup>17</sup>R<sup>18</sup>-substituted (C<sub>1</sub>-C<sub>4</sub>)-alkyl, (C<sub>1</sub>-C<sub>4</sub>)-alkanoyl,  
(C<sub>1</sub>-C<sub>4</sub>)-alkoxycarbonyl or NR<sup>12</sup>R<sup>13</sup>,

where

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$R^{12}$  and  $R^{13}$  independently of one another represent hydrogen or (C<sub>1</sub>-C<sub>4</sub>)-alkyl

or

5

$R^{12}$  and  $R^{13}$  together with the nitrogen atom to which they are attached form a 5- or 6-membered heterocycle which may contain a further heteroatom O or N in the ring and which may be substituted by (C<sub>1</sub>-C<sub>6</sub>)-alkyl, (C<sub>1</sub>-C<sub>6</sub>)-alkanoyl or (C<sub>1</sub>-C<sub>6</sub>)-alkoxycarbonyl,

10

and

15

$R^{17}$  and  $R^{18}$  independently of one another represent hydrogen, optionally hydroxyl-substituted (C<sub>1</sub>-C<sub>4</sub>)-alkyl or phenyl

or

20

$R^{17}$  and  $R^{18}$  together with the nitrogen atom to which they are attached form a pyrrolidine ring,

or

25

$R^{10}$  and  $R^{11}$  together with the nitrogen atom to which they are attached form a 7- to 12-membered bicyclic or tricyclic heterocycle which is fused or spirocyclic, which may have one or two further heteroatoms from the group consisting of N and O in the ring and which may be

30

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substituted by (C<sub>1</sub>-C<sub>4</sub>)-alkyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxycarbonyl,  
(C<sub>1</sub>-C<sub>4</sub>)-alkanoyl or benzyl,

and C(=O)R<sup>14</sup>

5

in which

R<sup>14</sup> represents (C<sub>1</sub>-C<sub>6</sub>)-alkoxy, (C<sub>1</sub>-C<sub>6</sub>)-alkylamino or a 5-  
to 10-membered mono- or bicyclic heterocycle which is  
attached via a nitrogen atom, which is fused or  
spirocyclic and which may have one or two further  
heteroatoms from the group consisting of N and O in  
the ring,

15

where alkylamino for its part may be substituted by a 5-  
or 6-membered heterocyclyl,

or a salt, a hydrate, a hydrate of a salt or a solvate thereof.

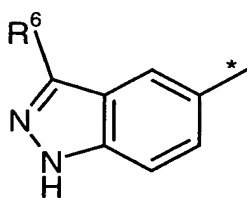
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3. The compound as claimed in claim 1 or 2

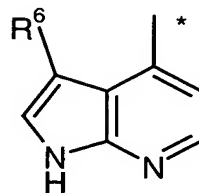
in which

A represents a radical

25



or



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in which

$R^6$  represents hydrogen or methyl

5 and

\* denotes the point of attachment to the phenolic oxygen,

10  $R^1$  and  $R^2$  independently of one another represent hydrogen, fluorine or chlorine,

$R^3$  and  $R^4$  represent hydrogen,

15  $R^5$  represents a radical selected from the group consisting of:

hydrogen, chlorine, cyclohexyl, (C<sub>1</sub>-C<sub>4</sub>)-alkyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy,

20 where alkyl and alkoxy for their part may be substituted by hydroxyl, carboxyl, (C<sub>1</sub>-C<sub>4</sub>)-alkoxy, methyloxycarbonyl, ethyloxycarbonyl, NR<sup>8</sup>R<sup>9</sup> or C(=O)NR<sup>8</sup>R<sup>9</sup>,

in which

25  $R^8$  and  $R^9$  independently of one another represent hydrogen, (C<sub>1</sub>-C<sub>8</sub>)-alkyl, cyclopropyl, optionally methyl-substituted cyclopentyl or optionally fluorine-substituted phenyl

or

30

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$R^8$  and  $R^9$  together with the nitrogen atom to which they are attached form a piperidine, 2-methylpiperidine or 2,6-dimethylpiperidine ring,

5 phenyl, pyridyl, pyrrolyl, piperidin-3-yl, piperidin-4-yl, pyrrolidin-2-yl,

where phenyl, pyridyl and pyrrolyl for their part may be substituted by fluorine, chlorine, bromine, cyano, nitro,  
10 trifluoromethyl, methyl, hydroxymethyl, methoxy, dimethylamino or morpholinyl,

and

15 piperidin-3-yl, piperidin-4-yl and pyrrolidin-2-yl for their part may be substituted by methyl, ethyl, n-propyl, isopropyl, methylcarbonyl or ethylcarbonyl,

$NR^{10}R^{11}$

20

in which

$R^{10}$  and  $R^{11}$  independently of one another represent hydrogen, (C<sub>1</sub>-C<sub>4</sub>)-alkyl, 3-hydroxypropyl, 2-hydroxycyclohexyl,  
25 2-aminocyclohexyl, phenyl, pyridyl or pyrazolyl,

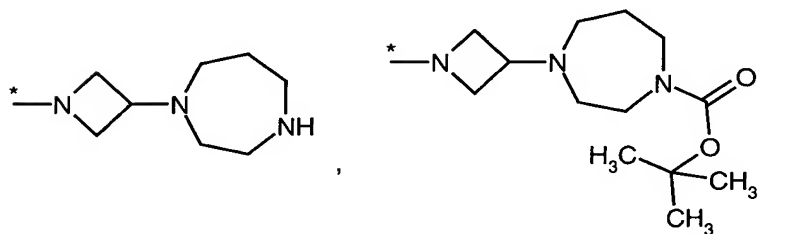
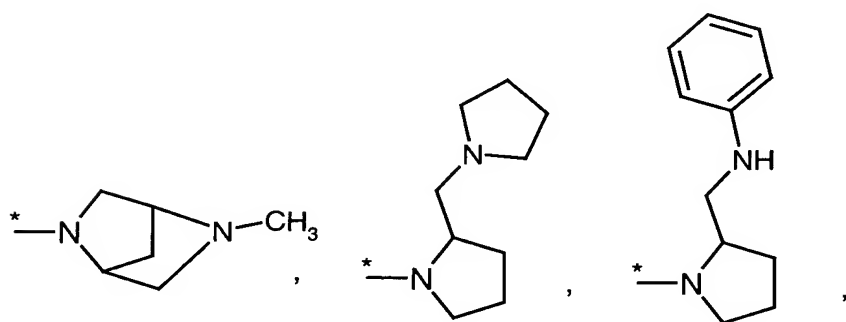
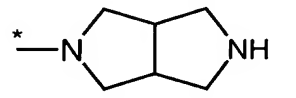
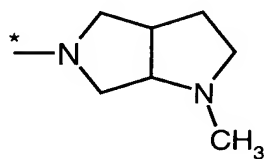
where phenyl and pyridyl for their part may be substituted by chlorine, hydroxyl, amino, cyano, methyl or methoxy,

30

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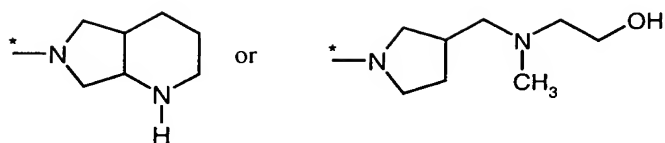
or

$R^{10}$  and  $R^{11}$  together with the nitrogen atom to which they are  
 attached form a piperazine, 3-methylpiperazine, 3,5-  
 dimethylpiperazine, 4-isobutylpiperazine, morpholine,  
 pyrrolidine, 3-aminopyrrolidine, 3-methylamino-  
 pyrrolidine, 3-(*N,N*-dimethylamino)pyrrolidine,  
 2-aminomethylpyrrolidine, 3-hydroxypyrrolidine,  
 2-hydroxymethylpyrrolidine or 2-methoxymethyl-  
 pyrrolidine ring or a radical





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in which

5 \* denotes the point of attachment to the pyrimidine ring,

and C(=O)R<sup>14</sup>

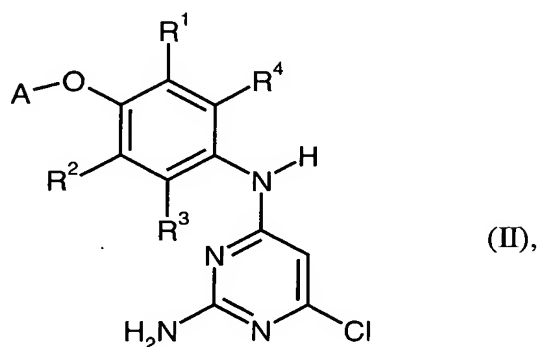
10 in which

R<sup>14</sup> represents methoxy, piperidinyl-N-ethylamino, piperidinyl or piperazinyl,

15 or a salt, a hydrate, a hydrate of a salt or a solvate thereof.

4. A process for preparing compounds as defined in claim 1, characterized in that either

20                    [A]       compounds of the formula (II)

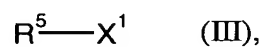


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in which

A, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> are as defined in claim 1

5 are reacted with compounds of the formula (III)

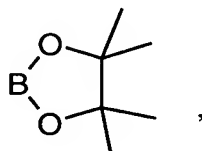


in which

10

R<sup>5</sup> is as defined in claim 1 and

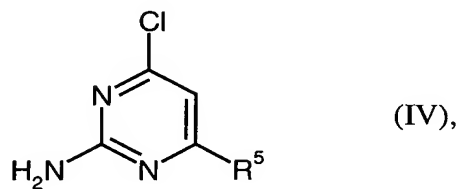
X<sup>1</sup> represents hydrogen, B(OH)<sub>2</sub> or a boronic acid ester such as



15

or

[B] compounds of the formula (IV)



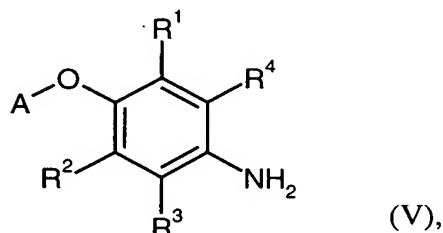
20

in which

R<sup>5</sup> is as defined in claim 1

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are reacted with compounds of the formula (V)



5 in which

A, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> are as defined in claim 1.

- 10 5. The compound as defined in any of claims 1 to 3 for the treatment and/or prophylaxis of disorders.
6. The use of a compound as defined in any of claims 1 to 3 for preparing medicaments for the treatment and/or prophylaxis of cardiovascular disorders.
- 15 7. The use of a compound as defined in any of claims 1 to 3 for preparing medicaments for the treatment and/or prophylaxis of erectile dysfunction.
8. A method for the treatment and/or prophylaxis of cardiovascular disorders wherein a cardiovascularly effective amount of a compound as defined in any of claims 1 to 3 is used.
- 20 9. A medicament, comprising a compound as defined in any of claims 1 to 3 and a further active compound.
- 25 10. A medicament comprising a compound as defined in any of claims 1 to 3 in combination with an inert nontoxic pharmaceutically acceptable auxiliary.